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STUDIES IN THE BORAGINACEAE, XVIII
BORAGINACEAE OF THE SOUTHERN WEST INDIES

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PRELIMINARY TO THE PREPARATION of an account of the Boraginaceae of Trinidad and Tobago it has been found desirable to survey the representation of the family in the West Indies. Some of the results are here presented in a synopsis of the species known from the Lesser Antilles, Tobago, and Trinidad. Special attention has been given to the details of distribution in the southern West Indies and to the taxonomic history of the species concerned. The study is primarily based on the collections of the Gray Herbarium (G), but numerous specimens from the New York Botanical Garden (NY), the United States National Herbarium (US), and the Trinidad Botanic Garden Herbarium (T), have also been examined.

KEY TO GENERA

Style twice cleft, with the four branches each bearing a stigma...1. *Cordia.*
Style cleft or simple.
  Style evidently cleft, bearing two stigmas.
    Corolla subrotate; flowers and leaves produced on dense axillary short-shoots; plant frequently spiny.....2. *Rochefortia.*
    Corolla salverform; plant unarmed.....3. *Bourreria.*
  Style simple or very short or none; stigma annular, usually surmounted by a sterile, conic or cylindric, occasionally lobed appendage.
    Fruit with fleshy mesocarp; large shrubs.....4. *Tournefortia.*
    Fruit dry, without any fleshy mesocarp; herbaceous.....5. *Heliotropium.*

1. CORDIA

KEY TO THE SPECIES

Corolla vermilion, about 4 mm. long, frequently 6-lobed; mature fruit hard, dry, ovoid, 20–25 mm. long, completely and tightly invested by the calyx that becomes white and fleshy.....1. *C. Sebestena.*

Corolla white or cream-colored, 5-lobed; calyx not fleshy at maturity.
Pubescence stellate; corolla marcescent, persistent; fruit slender, elongate, thin-walled, dry, developing ensheathed by corolla-tube and 10-ribbed cylindrical calyx, when fully mature the whole flower falling with the enclosed fruit, the still spreading corolla-lobes functioning as a parachute.....2. *C. alliodora.*
Pubescence simple or none; corolla withering, falling after anthesis; fruit drupaceous.
Corolla very large, 35–50 mm. long, the slender exserted tube abruptly and broadly expanded into a well-developed cylindrical throat; inflorescence capitate; tips of calyx-lobes conspicuously long-attenuate.....3. *C. grandiflora.*
Corolla less than 15 mm. long and usually much shorter, without a well-differentiated tube and throat.
Fruiting calyx half to almost completely investing the drupe, the latter red, 4–6 mm. long, with a thin quickly dessicated flesh; stone irregularly warted; corolla-limb usually only shallowly and very broadly lobed; plant usually with a sagy odor.
Inflorescence not distinctly spicate.
Calyx-lobes with prolonged hairy setaceous tips about 5 mm. long; inflorescence a globose head 1.5–3 cm. in diameter.....4. *C. globosa.*
Calyx-lobes acute, without prolonged tips.
Upper leaf-surface bearing short stiff hairs in great abundance; inflorescence terminal or internodal but never axillary, repeatedly forked and becoming a loose open cyme at maturity; corolla with reflexed, crisped, lacerate-dentate lobes about as long as broad.....5. *C. salvifolia.*
Upper leaf-surface glabrous or apparently so, stiff hairs few, scattered and inconspicuous; inflorescences mostly axillary, simple or sparingly branched, the cymes capitate or glomerate and loosening little if at all in most advanced maturity; corolla with obscure lobes several times as broad as long, margins entire or nearly so..6. *C. polycephala.*
Inflorescence spicate.
Spikes mostly axillary, with the peduncle and the petiole of the subtending leaf united for 3–9 mm. at their base; upper surface of leaves more or less lustrous, with scattered tightly appressed hairs.....7. *C. Schomburgkii.*
Spikes all terminal or internodal, never axillary; upper surface of leaves glabrous or bearing ascending or erect hairs.

Corolla-limb subentire, its very short inconspicuous lobes several times broader than long; calyx-lobes usually with short but distinct tips that are free in the bud; spike dense, in fruit 10–15 mm. thick; fruit matured in a subinflated calyx....8. *C. martinicensis.*

Corolla smaller, the limb with evident reflexed lobes about as broad as long; calyx-lobes without prolonged tips that are free in the bud; spikes frequently becoming loose and interrupted, in fruiting state usually 8 mm. or less thick; fruit partially protruding from the cup-shaped calyx.

Leaves lanceolate to lance-ovate, broadest at or below middle, apex acute, margin entire or somewhat dentate or crenate, upper surface usually glabrous or rarely with short stiff hairs; corolla-lobes entire or obscurely erose-dentate, weakly if at all crisped.....9. *C. curassavica.*

Leaves broadest at or above middle, apex usually rounded, margin usually evidently crenate or dentate, upper surface at least on young foliage usually with evident soft hairs; corolla-lobes usually erose-dentate and crisped.....10. *C. divaricata.*

Fruiting calyx usually explanate or saucer-shape, covering only the very base of the drupe, the latter 8–16 mm. long and with a very well-developed juicy mesocarp; stone ribbed or lacunose.

Calyx 10-ribbed, in the bud appendaged at apex, usually irregularly circumscissile below summit; corolla showy, broadly funnelform, its lobes emarginate and about as broad as long.....11. *C. dentata.*

Calyx not distinctly ribbed, not appendaged at apex, usually opening regularly and 5-lobed; corolla with cylindrical tube and spreading elongate lobes.

Petioles of well-developed leaves 1.5–4 cm. (usually 2–3 cm.) long.

Leaves 5–11 cm. long, lower surface (as well as petiole and branches of inflorescence) practically glabrous at maturity; fruit a very plump and juicy drupe, 1.5 cm. long, pink or salmon in color.....12. *C. obliqua.*

Leaves 10–20 cm. long, with brownish indument of abundant short soft appressed hairs on lower surface, as well as on petiole and branches of inflorescence; fruit a whitish drupe, 8–10 mm. long....13. *C. tetrandra.*

Petioles of well-developed leaves 0.2–1.5 cm. (usually 0.5–1 cm.) long.

Leaves usually broadest above middle, apex acute or with a coarse, generally obtusish short prolongation; tree deciduous, producing its inflorescence on bare twigs before or simultaneously with the appearance of the new leaves of the season; fruit red; flowers markedly heteromorphic, those on each tree functionally either male or female.....14. *C. Collococca.*

Leaves usually broadest below the middle, at least the larger ones with a sharp prolonged attenuate tip; plant bearing its inflorescence on leafy shoots; fruit white or yellowish.

Lower leaf-surface with an evident pallid indument of abundant minute whitish hairs, the hairs confined to the veins and veinlets and appressed and directed concentrically over the numberless areoles in the veinlet-reticulum; fruit strigose; flowers homomorphic, perfect, functionally bisexual.....15. *C. bicolor.*

Lower leaf-surface velvety and somewhat glabrescent, green, gray or tawny, the areoles in the veinlet-reticulum not covered by appressed, concentrically directed hairs; fruit glabrous.

Flower-buds large, 7–9 mm. long, broadly clavate; calyx coarsely and irregularly 2–3-lobed, its margins fragmenting and erose; flowers homomorphic, all perfect and functionally bisexual.....16. *C. elliptica.*

Flower-buds smaller, 2.5–4 mm. long; calyx with 5 small subequal teeth; flowers markedly dimorphic, those on a particular tree functionally either male or female; female flowers with a clavate-cylindric bud, at anthesis with a cylindric calyx, an inconspicuous corolla, small stamens and evidently protruding styles; male flowers with a subglobose or globose bud, at anthesis with a cup-shaped calyx, evident corolla-limb, conspicuously exserted stamens and reduced included female organs.

Larger leaves usually subcordate at base, tip acute or moderately attenuate, blade up to 19 cm. broad, usually strigose or rather smooth above though at times somewhat velvety, at most only moderately scabrous; twigs, petioles and inflorescence tomentose-floccose, velvety or strigose, the short hairs spreading or appressed.....17. *C. sulcata.*

Larger leaves acute, obtuse or rounded at base, the tip attenuate and prolonged.

Leaf decidedly scabrous above, with rigid hairs only moderately appressed; blade up to 15 cm. broad; twigs, petioles, and inflorescence bristly with stiff hairs 1–2 mm. long, if also bearing other hairs these minute appressed and (especially on the twigs) usually retrorse.....18. *C. panamensis.*

Leaf with very minute closely appressed hairs and rather smooth; blade up to 11 cm. broad; twigs, petioles and inflorescence not at all bristly, very finely strigose with the minute short hairs very closely appressed and all antrorse.19. *C. sericicalyx.*

1. **Cordia Sebestena** L. Sp. Pl. 190 (1753). — Type West Indian.

Native of the West Indies and ranging from the Bahamas to northern Venezuela; now widely cultivated in the tropics.

GUADELOUPE: *Duss 2754* (G). MARTINIQUE: *Hahn 763* (G). BARBADOS: *Eggers 7183* (G).

2. **Cordia alliodora** (R. & P.) Cham. ex DC. Prodr. 9: 472 (1845); Urban, Symb. Ant. 8: 574 (1921); Johnston, Contr. Gray Herb. 73: 77 (1924) and l.c. 92: 13 (1930).

Cerdana alliodora R. & P. Fl. Peruv. **2**: 47, *t. 184* (1799). — Type Peruvian.

Cordia Gerascanthus, var. *subcanescens* DC. Prodr. 9: 472 (1845). — Type West Indian.

Cordia Gerascanthus, var. *domingensis* Cham. ex DC. Prodr. **9**: 472 (1845), in synonymy.

Cordia Gerascanthus, forma *martinicensis* Chodat, Bull. Soc. Bot. Genève, sér. 2, **12**: 210 (1920).—Type from Martinique, *Hahn 626.*

Cordia Gerascanthus, forma *micrantha* Chodat, Bull. Soc. Bot. Genève, sér. 2, **12**: 210 (1920).—Type West Indian.

Cordia Gerascanthus of many authors, not of Linnaeus.

Widely distributed in tropical America.

MONTSERRAT: *Shafer 557* (NY, US). ANTIGUA: *Box 1316* and *1342* (US); *Rose, Fitch & Russell 3320* and *3456* (US). GUADELOUPE: *Duss 2580* (G, US, NY); *Questel 694* (US); *Stehlé 85* (NY), *126* (US), *559* (US), and *2684* (G). DOMINICA: *Imray* (G); *Hodge 1627* (G). MARTINIQUE: *Duss 1425* (NY, US); *Stehlé 6031* (G). ST. VINCENT: *Smith 1249* (G, NY). TRINIDAD: *Sieber 121* (G, NY); *Broadway 5547* and *9845* (G); *Fairchild 2863* (G).

North of our area the species is known from the Virgins, Porto Rico, Haiti and Cuba. Although reported from Jamaica it is almost certainly not native there. The West Indian material of *C. alliodora* has its twigs much less deformed by ant-domatia than that of Central America and northwestern South America. The older writers identified the plant with *C. Gerascanthus,* but that is a very different species native to Cuba, Jamaica, and adjoining Central America. For an excellent very detailed account of our tree see R. C. Marshall, Silviculture of trees of Trinidad and Tobago, pp. 167–172 (1939). He reports the plant from Tobago as well as from Trinidad.

3. **Cordia grandiflora** (Desv.) HBK. Nov. Gen. et Sp. **3**: 77 (1818); Johnston, Jour. Arnold Arb. **16**: 32 (1935).

Varronia grandiflora Desv. Jour. de Bot. **1**: 273 (1809).—Type from Venezuela.

Ranging from British Guiana to central Venezuela and southward into the Amazon Basin; Trinidad.

TRINIDAD: Caparo, June 1918, *Broadway* (T); "Trinidad," Aug. 1928, *Abrahams, Herb. Trin. 12215* (T).

According to Williams & Williams, Useful and Ornamental Pl. Trinidad, ed. 3, p. 112 (1941), the plant is frequently found in peasant gardens in southern Trinidad.

4. **Cordia globosa** (Jacq.) HBK. Nov. Gen. et Sp. **3**: 76 (1818).

Varronia globosa Jacq. Enum. 14 (1760) and Sel. Stirp. 41 (1763).—In Caribaearum maritimis.

Varronia dasycephala Desv. Jour. de Bot. **1**: 274 (1808).—Habitat in Cumana, Antigua, arenosis humidis.

Cordia dasycephala (Desv.) HBK. Nov. Gen. et Sp. **3**: 76 (1818).

Cordia sphaerocephala Humb. ex R. & S. Syst. **4**: 801 (1820).—In arenosis Cumanae.

Varronia sphaerocephala Willd. ex HBK. Nov. Gen. et Sp. **3**: 453 (1820).

Cordia bullata, var. *angustata* DC. Prodr. **9**: 496 (1845).—Type from Guadeloupe.

Ranging south through the Lesser Antilles into South America.

ST. BARTHÉLEMY: *Questel 578* (US). ST. KITTS: *Britton & Cowell 257* (US); *Rose, Fitch & Russell 3240* (US). ANTIGUA: *Box 1160* (US); *Rose, Fitch & Russell 3330* (G, US). MONTSERRAT: *Shafer 232* and *510* (US). GUADELOUPE: *Duss 2575* (G, US); *Stehlé 2681* (G). DOMINICA: *Hodge 2769* and *3861* (G). MARTINIQUE: *Duss 652* (US).

The species as here accepted includes plants from the Lesser Antilles, Trinidad, Venezuela, and eastern Brazil. Related plants of the Greater Antilles, Mexico, and Central America are separated as *C. globosa* var. *humilis* (Jacq.) Johnston, Jour. Arnold Arb. 30: 98 (1949). They are distinguished by their leaves, which not only average much smaller than in typical *C. globosa,* but also have the marginal teeth and apex obtuse rather than acute. Also related to *C. globosa* are *C. caput-medusae* Taub., a very glandular plant of Brazil, and *C. subtruncata,* a Colombian plant with pallid strigose herbage. There are some other closely related but separable plants in Colombia and Venezuela, but these are as yet unnamed.

No type of *Varronia globosa* is preserved. It is necessary to interpret the species entirely from Jacquin's short diagnosis and vague remarks. They are as follows: "VARRONIA (*globosa*) spicis globosis, aequalibus. Frutex hic perfecte congruit cum Varronia martinicensi. Discrimen solum est in constanti globositate spicarum, in corollarum laciniis emarginatis ipsis, & in stigmate obtuso quadruplici. Habitat in Caribaearum maritimis." Curiously, there is no mention of the setaceous calyx-lobes, probably the most distinctive feature of our species, cf. Johnston, Jour. Arnold Arb. 30: 102 (1949). Jacquin's statement that his *V. globosa* agrees closely with *V. martinicensis,* except as to inflorescence and floral structures, offers the most help in placing it. The foliage of typical *C. globosa,* as I have delimited it, agrees well in size, shape, and dentation with that shown in Jacquin's illustration of the type of *V. martinicensis.* Since *V. globosa* is given by Jacquin as Caribbean (i.e., West Indian and not continental), it very likely came from the Lesser Antilles, where he did much collecting and could have compared growing plants with *C. martinicensis.*

5. **Cordia salvifolia** Juss. ex Poir. Encyc. 7: 46 (1806). — Source of type not given.

Endemic to the Lesser Antilles.

BARBUDA: *Box 613* (US). ANTIGUA: *Box 1034* (US); *Rose, Fitch & Russell 3339* (G, US). MONTSERRAT: *Shafer 495* (US). GUADELOUPE: *Duss 3959* (US); *Stehlé 2025* (US), *2689* (G), *2698* (G), *6161* (G). MARIE GALANTE: *Stehlé 165* (US), *2678* (G). DÉSIRADE: *Stehlé & Quentin 5340* (US). MARTINIQUE: *Duss 287* (US). ST. LUCIA: *Beard 1080* (G).

A very distinct member of the section Varronia which is endemic to our area. It is readily distinguished from all immediate relatives by its large, loose, repeatedly forked cymes. Many of the specimens have parasitized fruit, which eventually contains smooth ellipsoidal pupae suggestive of seeds. Normal fruit, however, has the irregular tuberculate single-seeded stone characteristic of all Varronias.

6. **Cordia polycephala** (Lam.) Johnston, Jour. Arnold Arb. **16**: 33 (1935).

Varronia polycephala Lam. Tab. Encyc. **1**: 418 (1791); Poir. Encyc. **4**: 263 (1798). — Type from "America."

Varronia paniculata Wikström [Öfv. Guadeloupe. Fl.], K. Vet. Akad. Handl. **1827**[1]: 59 (1828). — Type from Guadeloupe, Forsström.

Cordia Wickstroemii Steud. Nom. ed. 2, **1**: 419 (1841). — Based on *Varronia paniculata* Wikst. not *Cordia paniculata* Roth.

Cordia Wikstromii Steud. ex DC. Prodr. **9**: 495 (1845).

Cordia sulfurata Krause, Beih. Centralb. **32**[2]: 341 (1914). — Type from St. Vincent, *Krause 11821.*

Cordia ulmifolia, var. *ovata* DC. Prodr. **9**: 495 (1845). — Type West Indian.

Cordia ulmifolia, var. *ovalis* DC. Prodr. **9**: 495 (1845). — Type West Indian.

Ranging from the southern parts of the Dominican Republic south through Porto Rico, the Virgins and Lesser Antilles into northern South America.

ST. BARTHÉLEMY: *Stehlé 7076* (G). ST. KITTS: *Britton & Cowell 203* (NY). GUADELOUPE: *Stehlé 3* (NY), *1100* (US), *2614* (US), *2680* (G), *2695* (G); *Duss 2576* (G, NY, US). DOMINICA: *Cooper 22* and *141* (G, NY, US); *Lloyd 420* and *688* (NY); *Hodge 792* (US), *793* (NY, US), *1451* (G), *2217* (G), *2319* (G), *2905* (G), *3900* (G). MARTINIQUE: *Hahn 873* (G, US); *Duss 1421* (G, NY, US); *Stehlé 3646* (G). ST. VINCENT: *Eggers 6551* (G); *Smith 781* (G); *Beard 1347* (G). GRENADA: *Broadway* (G, US, NY).

The name *C. polycephala* is here restricted to the more southerly and easterly of the two West Indian species formerly included in the aggregate of tropical American shrubs assembled under the names *"C. corymbosa"* or *"C. ulmifolia."* It ranges from the Dominican Republic south through our area into northern South America. On the southern continent it is most abundant in Venezuela, but it also occurs west to northern Colombia and in Brazil at least as far south as Ceará. The species is reported from Trinidad, but I have seen no material from the island and doubt that it is native there. It has recently been reported from St. Lucia, Stehlé, Carib. Forester 8: 106 (1947).

The former aggregate species of which *C. polycephala, sensu stricto,* is a small part, breaks up into two well-marked groups distinguishable by differences in inflorescence. In one the cymes are chiefly axillary, only the first produced by the shoot being terminal. In the other the cymes are all terminal, but, with the elongation of the shoot, come to be borne on stem internodes without any subtending leaf. *Cordia polycephala,* as here narrowly delimited, has an axillary inflorescence as does also *C. lineata* (L.) Don and *C. patens* HBK. These three segregates of the old complex may be at times difficult to distinguish in Venezuela but elsewhere are recognizable at a glance. They have very different patterns of geographical distribution. *Cordia polycephala* extends north via the Lesser Antilles to

Hispaniola. *Cordia lineata* appears in the northern and western parts of Hispaniola and extends to Cuba, Jamaica, Central America, and, apparently, Venezuela, cf. Johnston, Jour. Arnold Arb. 30: 92 (1949). *Cordia patens,* in contrast, is a shrub of the Amazonian headwaters and extends from the Guianas to eastern Peru.

The segregates of the old complex having extra-axillary inflorescences have their center of distribution south of the Equator. *Cordia bifurcata* R. & S. ranges from Costa Rica and Colombia south along the Andes into Argentina, cf. Johnston, Jour. Arnold Arb. 30: 90 (1949). *Cordia boliviana* Gandog. is Bolivian. *Cordia urticifolia* Cham. is a coarsely strigose representative of the group in Brazil and Paraguay. Another member is *C. discolor* Cham. of Brazil. Of all these southern representatives only *C. discolor* shows instability as to type of inflorescence. It is the only one of the southern group which now and again makes embarrassing approaches towards *C. polycephala.*

The first name given to our plant appears to be *Varronia polycephala* Lam., which was described as follows: "1887, *Varronia polycephala.* V. foliis ovato-lanceolatis, serrati; pedunculis lateralibus; spicis globosis. Ex America. ♄ *Pluk. t. 328 f. 5? Il varie à pédoncules rameaux.*" The brief description certainly applies to some member of the former aggregate of which our plant is a part. Poiret, Encyc. 4: 263 (1797), so accepted it and so have all subsequent authors. I am assuming that Lamarck's type came from the French West Indies. If investigations at Paris prove this to be incorrect, then the next available name for our species is *C. Wickstroemii* Steud.

A few comments should be made regarding the name *Varronia monosperma* Jacq. Pl. Rar. Hort. Schoenbr. 1: 18, *t. 39* (1797). The material upon which that species is described is said to have come from Caracas, Venezuela, a locality at which *C. polycephala* has been repeatedly collected. Jacquin's beautiful and very detailed plant of *V. monosperma* is unlike any plant I have seen from Central America, the West Indies, or northern South America. In fact it seems to represent the Brazilian and Paraguayan plant described as *C. urticifolia* Cham. (1829). The illustration shows very clearly the extra-axillary, internodal or oppositiflorous inflorescences that characterize the relatives of true *C. polycephala* south of the Equator. Jacquin's name is, in fact, the oldest name applied to that group. It has exact synonyms in *C. monosperma* (Jacq.) R. & S., 1819, *Varronia corymbosa* Desv. Jour. de Bot. 1: 275 (1809), and *Cordia corymbosa* (Desv.) Don, 1838.

7. **Cordia Schomburgkii** DC. Prodr. 9: 490 (1845); Johnston, Jour. Arnold Arb. 16: 39 (1935). — Type from British Guiana.

Cordia tobagensis Urban in Fedde, Repert. **16:** 39 (1919). — Type from Tobago, *Broadway 3072.*

Cordia tobagensis, var. *Broadwayi* Urban in Fedde, Repert. **16:** 40 (1919). — Type from Tobago, *Broadway 4235.*

Known only from the Guianas and from Tobago.

TOBAGO: Dennet Estate, *Broadway 4235* (G, pt. of TYPE); Forest Reserve beyond Caledonia, *Broadway 3072* (G, pt. of TYPE); Menna Road near Mason Hall, low shrub, fl. white, June 6, 1925, *Williams, Herb. Trin. 11140* (T); Mt. St. George-Castara road, Oct. 18, 1937, *Cheesman, Herb. Trin. 13208* (T).

8. **Cordia martinicensis** (Jacq.) R. & S. Syst. 4: 461 (1819).

Varronia martinicensis Jacq. Enum. 14 (1760) and Sel. Stirp. 41, *t. 32* (1763). — Type from Martinique.

Known only from Dominica, Martinique and St. Lucia.

DOMINICA: *Hodge 2543* and *2663* (G). MARTINIQUE: *Duss 1423* (G, US); *Hahn 286* (G, US); *Sieber 60* (G); *Bailey 252* (US); *Stehlé 1040* (G, US), *2128* (NY), *3470* (G), *3642* (G), and *6925* (G). ST. LUCIA: *Beard 1011* (G).

9. **Cordia curassavica** (Jacq.) R. & S. Syst. 4: 460 (1819); Johnston, Jour. Arnold Arb. 30: 99 (1949).

Varronia curassavica Jacq. Enum. 14 (1760) and Sel. Stirp. 40 (1760). — Type from Curaçao.

Varronia macrostachya Jacq. Enum. 14 (1760) and Sel. Stirp. 41 (1763). — Type from Cartagena, Colombia.

Cordia macrostachya (Jacq.) R. & S. Syst. **4**: 461 (1819); Johnston, Jour. Arnold Arb. **16**: 36 (1935).

Varronia guianensis Desv. Jour. de Bot. **1**: 270 (1809). — Type from French Guiana.

Cordia canescens HBK. Nov. Gen. et Sp. **3**: 73. (1818). — Type from Ibaque, Colombia.

Cordia graveolens HBK. Nov. Gen. et Sp. **3**: 74 (1818). — Type from between Ferreras and Angostura, Venezuela.

Cordia cylindrostachya, var. *graveolens* (HBK.) Griseb. Fl. Brit. W. I. 480 (1861).

Cordia spicata Willd. ex R. & S. Syst. **4**: 799 (1819). — Type from Angostura, Venezuela.

Cordia rugosa Willd. ex R. & S. Syst. **4**: 801 (1819). — Type South American.

Cordia interrupta DC. Prodr. **9**: 491 (1845). — Type from French Guiana.

Cordia cylindrostachya, var. *interrupta* (DC) Griseb. Fl. Brit. W. I. 480 (1861).

Cordia oxyphylla DC. Prodr. **9**: 492 (1845). — Type from British Guiana.

Lithocardium cylindrostachyum, var. *platyphyllum* Kuntze, Rev. Gen. **2**: 438 (1891). — Type from Trinidad.

Cordia chepensis Pittier, Contr. U. S. Nat. Herb. **18**: 253 (1917). — Type from Panama.

Cordia littoralis Pittier, Contr. U. S. Nat. Herb. **18**: 253 (1917). — Type from Costa Rica.

Ranging in northern South America (French Guiana to Colombia) and north into Central America and the Lesser Antilles.

MARTINIQUE: *Duss 289* (NY). ST. VINCENT: *Smith 470* (G, NY). GRENADA: *Eggers 6139* (G); *Broadway 141* (G, NY). BARBADOS: *Dash 14* (NY). TOBAGO: *Eggers 5458* (G); *Elmore* (G); *Broadway 4254* (G,

NY). TRINIDAD: *Johnston 78* (G); *Broadway 11* (G); *Britton & Hazen 18* (G); *Riley 68* (NY).

The plant has sharp-pointed, lanceolate or lance-ovate leaves which are green and usually glabrous above. The upper leaf-surface may be smooth but commonly is more or less roughened by minute siliceous tuberculations present there in varying abundance and development. Occasionally the tuberculations become conic or even prolonged into short stiff bristle-tips. The surface of the leaf, however, is never soft hairy nor more or less velvety. The xerophytic form of the species has thickish lanceolate leaves 1.5–4 cm. broad, roughened on the upper face by an abundance of tuberculations. It is the form represented by the type of *Varronia curassavica*. In more sheltered places and especially those with much rainfall, the plants produce larger, proportionately broader and thinner leaves, 4–9 cm. wide, on which the upper surface is nearly bare or has tuberculations much reduced in size and number. Its spikes also tend to become very elongate. This is the form described as *Varronia macrostachya* Jacq. An extreme phase of this broad-leaved form was described from Trinidad as *Lithocardium cylindrostachyum*, var. *platyphyllum* Kuntze. For our purposes it may be called **Cordia curassavica**, var. **platyphylla** (Kuntze), comb. nov. As the name for the mesophytic phases with broad leaves it is applicable in our region only to plants collected on Trinidad and Tobago.

The present species, though not distinguished from *C. cylindrostachya* by many West Indian botanists, is readily separable from that more southerly ranging South American species by its complete lack of axillary spikes. True *C. curassavica* is very different in appearance and readily separable at a glance from the various closely related but as yet imperfectly defined species that occur north of it in the Greater Antilles and in Mexico. These latter are excluded from *C. curassavica* as here accepted. Our species is a natural and practicable one that occurs in northern South America from the Guianas to Colombia and extends north into Central America and the Lesser Antilles. A complete listing of its synonyms has been given above.

10. **Cordia divaricata** HBK. Nov. Gen. et Sp. **3**: 74 (1818); R. & S. Syst. 4: 802 (1819); Johnston, Jour. Arnold Arb. 30: 101 (1949). — Type from Cumana, Venezuela.

Cordia cuneiformis DC. Prodr. **9**: 492 (1845). — Type from Caracas, Venezuela.

Northern Venezuela and adjacent Colombia, Curaçao, Martinique, Dominica.

DOMINICA: *Hodge 3808* (G); *Lloyd 839* (US). MARTINIQUE: *Duss 288* and *289* (NY); *Stehlé 3471* (G).

A relative of *C. curassavica* distinguishable by its usually smaller, generally more or less oblanceolate or obovate leaves, usually soft hairy on the upper surface. Its calyx tends to have lobes less sharply triangular and proportionately broader than in its relative.

11. **Cordia dentata** Poir. Encyc. 7: 48 (1806); Johnston, Jour. Arnold Arb. 21: 347 (1940). — Type from Curaçao.

"Cordia alba" of most authors.

West Indies, Mexico, Central America, and northern South America; frequently cultivated.

ST. BARTHÉLEMY: *Questel 682* (US). GUADELOUPE: *Duss 2757* (US); *Questel 824* (US); *Stehlé 950* (US), *2691* (G), *2843* (G). MARTINIQUE: *Duss 285* (US). ANTIGUA: *Box 1188* (G, US). BARBADOS: *Waby 68* (US); *Warming 98* (US). TOBAGO: *Broadway* (G). TRINIDAD: Chacachacare Isl., *Finlay, Herb. Trin. 1842* (T).

Readily recognized because of its toothed, slenderly petiolate leaves, broad funnelform shallowly lobed white corollas, ribbed calyx, and large watery white fruits. In West Indian botany the plant is well known under the name *Cordia alba* or *Calyptracordia alba,* names unhappily not properly applicable to it.

12. **Cordia obliqua** Willd. Phytogr. 4, *t. 4* (1794) and Sp. Pl. 1: 1072 (1797). — Type from western India.

Cordia tremula Griseb. Fl. Brit. W. I. 479 (1861). — Type from Barbados, *Lane.*

An Indian tree introduced into the West Indies, where it is now widely distributed.

ST. KITTS: *Fairchild 2635* (G, US); *Britton & Cowell 135* (NY). ANTIGUA: *Box 1428* (US); *Rose, Fitch & Russell 3370* (US). MONTSERRAT: *Shafer 124* and *209* (NY, US). GUADELOUPE: *Hahn 953* (US); *Stehlé 260* (US), *2683* (G). MARIE GALANTE: *Stehlé 195* (US). ST. VINCENT: *Smith 462* (G). GRENADA: *Beard 34* (G); *Broadway 1810* (G, US). BARBADOS: *Bovell 466* (NY); *Gooding* (G); *Eggers 7179* (G, US).

For the most of a century this tree has been known in the West Indies as *C. tremula* Griseb. and accepted as a native species, endemic to the Lesser Antilles. It is, however, a native of India and was introduced into the West Indies, probably during the eighteenth century, and most likely at Barbados. Mr. E. G. B. Gooding (in lit., June 1942) has some significant observations concerning the plant on Barbados. He notes that the species is absent from the few remnants of original forest on the island. It grows "wild" only on open waste land, seldom far from habitations, and is frequently cultivated. This ability to go wild is also demonstrated in Cuba. The trees in the Botanic Garden at Soledad, originating from Lesser Antillean seed, now have progeny in waste land outside the garden.

The name *Cordia obliqua* Willd. here applied to our plant is subject to future revision, although it certainly belongs to the particular form of the Indian plant represented in the Caribbean area. Unfortunately, it is only one of a confusing complex of many closely related forms represented in the tropics of Asia and Malaysia. Until the complex is thoroughly studied and a modern classification of it available, names applied to its forms can be only tentative. Nevertheless I am inclined to believe that the name selected may stand. The Indian tree, along with its other relatives in

southeastern Asia and the South Pacific, are readily distinguishable by form of style from the African and Levantine *C. Myxa* L., with which they were formerly associated. For the eastern complex there is only one name older than *C. obliqua* Willd. (1794), namely *C. dichotoma* Forst. (1786). This latter was applied to a plant of the wetter tropics and is distinguishable from *C. obliqua* by its thinner elliptic leaves and smaller flowers. The eventual monographer of the group will, I am confident, distinguish these two extreme forms, if not as species, then certainly as varieties.

13. **Cordia tetrandra** Aublet, Hist. Pl. Guian. 1: *222, t. 87* (1775); Johnston, Jour. Arnold Arb. 16: 11 (1935). — Type from French Guiana.

Widely distributed at low altitudes in tropical South America, but not common.

BARBADOS: Dodd's, St. Philip, 1902, *Bovell 437* (NY).

The specimen cited is probably from a cultivated tree. The species, however, has such a hit-and-miss distribution over so wide an area in tropical South America that its natural occurrence a little further north, as a rare tree in the southern West Indies, would not be surprising.

14. **Cordia Collococca** [Sandmark] L. Amoen. Acad. 5: 377 (1759), as *"C. Callococca."* — Type from Jamaica.

Cordia Collococca L. Sp. Pl. ed. 2, 274 (1762), excluding *"Cordia glabra* Sp. Pl. sp. 1 p. 191."

Cordia Calloçocca L. Syst. ed. 12, 176 (1767), excluding phrase "fol. cordato-ovatis."

Cordia micranthus Sw. Prodr. 47 (1788) and Fl. Ind. Occ. **1:** 460 (1797). — Type Jamaican.

Cordia ehretioides Lam. Tab. Encyc. **1:** 421 (1791); Urban, Symb. Ant. 8: 576 (1921). — Type from Santo Domingo.

Cordia Collococca, var. *ehretioides* (Lam.) Poir. Encyc. **7:** 42 (1806).

Cordia glabra of authors, not Linnaeus, cf. Johnston, Jour. Arnold Arb. **21:** 345 (1940).

Cuba and Mexico south to northern South America.

GUADELOUPE: *Duss 2577* (NY); *Stehlé 91* (NY), *66* (NY), *2682* (G). DOMINICA: *Hodge 3890* (G). MARTINIQUE: *Duss 282* (NY). ST. VINCENT: *Smith 1546* (NY), *1836* (G, NY). GRENADA: *Broadway* (G, NY). BARBADOS: *Gooding 609* (NY). TOBAGO: *Montserin, Herb. Trin. 13647* (T). TRINIDAD: *Britton, Freeman & Watts 2692* (G).

The plant is deciduous and develops its inflorescences late in the dry season on leafless or nearly leafless twigs, at least before the new growth of leaves is expanded. In having precocious inflorescences and bright red fruit it is readily separable from all other congeners in our area. In addition to those islands from which specimens are cited, the species is also reported from St. Barthélemy, Antigua, Bequia, and Mustique. A good account of the tree, with interesting field observations, has been published by R. C. Marshall, Silviculture of trees of Trinidad and Tobago, pp. 172–3 (1939).

The name of this well-marked species merits a few words of discussion. The first name applied to it was *Cordia Callococca* [Sandmark] Linnaeus (1759). It is one of the many binomials applied by Sandmark to Jamaican species described and named under polynomials in Browne's History of Jamaica. In the present instance Sandmark's page-reference to the History of Jamaica is incorrect, being "166" and not 167. In such a very abbreviated synopsis as that published by Sandmark this error might be very confusing indeed. However, a perusal of his dissertation makes it obvious that he intended his binomial, *C. Callococca,* to apply to the first of the two species of trees for which Browne had erected the genus *Collococca*. Sandmark's specific epithet was derived from Browne's generic name. The latter was given in allusion to the glutinous pulp in the fruit of the plant, a meaning lost by the vowel change in the specific epithet as published by Sandmark. This vowel change, I believe, is another example of typographical or clerical error in the dissertation. This is consistent with the fact that when Linnaeus, adopting the binomial proposed by his student, first treated the species in his own publications, he used the original Brownean spelling in the specific name. This he maintained in the third edition of the Species Plantarum, 274 (1764). Only in the last of his major works, Syst. ed. 12, 176 (1769), is the specific epithet *Callococca* used. Subsequent authors have spelled the name both ways. I have adopted *"Collococca"* as the correct spelling for the species, since I believe *"Callococca"* originated in error. The epithet has usually been capitalized and treated as a generic noun in apposition. As such, it is meaningless unless it conforms to the original Brownean spelling.

Though there may be some doubt as to the correct spelling of Sandmark's binomial, its correct application seems clear. The Jamaican tree discussed by Browne, History 167 (1756), as "Collococcus. 1. Foliis rugosis venosis oblongo-ovatis, floribus laxe racemosis," is evidently the same as the plant now under discussion.

In the past Sandmark's publication (Dec. 1759) has been overlooked, and the name *Cordia Collococca* has been accepted as established in the second edition of the Species Plantarum (1762). This publication of 1762 also has its complications. As has been discussed elsewhere, Jour. Arnold Arb. **21**: 345 (1940), by some error the name *Cordia glabra* L., Sp. Pl. 191 (1753), was listed as a synonym of *Cordia Collococca* rather than under *Ehretia Bourreria* L., where it properly belongs. With this incorrect synonym excluded, *Cordia Collococca* L. (1762) is based partially on the reference to Browne's History already used by Sandmark and partially on a reference to Sloane's great book on Jamaica, **2**: 95, *t. 203, f. 2* (1725). Sloane gives a good illustration and discussion of our plant.

15. **Cordia bicolor** A. DC. Prodr. **9**: 485 (1845); Johnston, Jour. Arnold Arb. **16**: 23 (1935) and **21**: 349 (1940). — Type from Dutch Guiana.

Lithocardium Lockartii Kuntze, Rev. Gen. **2**: 438 (1891). — Type from Trinidad, *Lockart.*

Cordia Lockartii Kuntze, Rev. Gen. **2**: 438 (1891), in synonymy.

Northern South America and northward in Central America; Trinidad.

ST. VINCENT: *Anderson* (Kew). TRINIDAD: *Britton & Broadway 2797* (G); *Britton 2500* (G, NY); *Britton & Hazen 1926* (G, NY); *Britton 549* (G, NY); *Eggers 1431* (Kew); *Eggers 1178B* (Berlin); *Lockart* (Kew, TYPE).

The specimens cited from St. Vincent probably came from a cultivated tree. Alexander Anderson was director of the botanical garden on St. Vincent from 1785 to 1811. I doubt if *C. bicolor* occurs naturally in the West Indies north of Trinidad. Some excellent field observations concerning the Trinidad tree are given (sub "*Cordia Lockhartii*") by R. C. Marshall, Silviculture of trees of Trinidad and Tobago, pp. 173–4 (1939). Marshall states that the ripe fruit is a greenish yellow drupe, ovoid-rounded, 12 mm. long, and covered with minute hairs. Its stone is said to be 10 mm. long, pointed at the apex, and irregularly furrowed.

16. **Cordia elliptica** Sw. Prodr. 47 (1788) and Fl. Ind. Occ. 1: 461 (1797); Urban, Symb. Ant. 3: 357 (1903). — Type from "Jamaica."

Cordia reticulata Vahl, Ecol. 3: 5 (1807). — Type from Montserrat, *Ryan*.
Cordia laevigata of authors.

A species endemic to the Lesser Antilles.

MONTSERRAT: *Shafer 345* (NY). GUADELOUPE: *Fairchild* (G): *Duss 2584; Stehlé 2679, 2692, 2693,* and *2844* (G). DOMINICA: *Cooper 58* and *142* (G, NY); *Beard 1464* (G); *Lloyd 244* (NY); *Hodge 1126, 1809, 2093, 2247, 2349, 2612, 3012, 3359,* and *3458* (G). MARTINIQUE: *Duss 242* (NY), *1422* (G, NY). ST. LUCIA: *Beard 495* (G).

I am following Urban in identifying our present plant with *C. elliptica* Sw. The specimen from the Swartz herbarium at Stockholm that appears to be the type of *C. elliptica* is labeled as from "Jamaica." It has an old inflorescence with some persisting, apparently blighted calyces. There are no corollas nor fruit. The indument on the inflorescence and calyces is sparse, but if these are persisting old ones found on a tree out of flower, that is not surprising. Although our species does have a dense strigose indument on new flowering inflorescences, the hairy covering thins out considerably on old inflorescences and even on fruit-bearing calyces. The herbage and stems of the Swartz type are indistinguishable from those of the plant of the Lesser Antilles. The type agrees well with plants from our area but is very different and readily separable from all members of its genus known from Jamaica. I am willing to believe that the type of *C. reticulata* was attributed to Jamaica through some error. It was more likely collected on Dominica, probably by Ponthieu.

The name *Cordia laevigata* Lam. Encyc. 1: 422 (1791); Poir. Encyc. 7: 46 (1806), has been applied to our plant. Judging from the original descriptions, however, Lamarck's plant must be very different from *C. elliptica,* particularly as to flowers. Indeed, it appears to be the same as the more northern *C. nitida* Vahl (1793), and being older, probably should be taken up in place of the latter.

Among West Indian species our plant is notable for its firm, glabrous, lustrous, strongly acuminate leaves, its elongate flower-buds that are clothed with abundant short appressed sericeous hairs, and its large glabrous drupe containing an obliquely ascending apically pointed stone. It is a very distinct species, perhaps most closely allied to plants of Venezuela and Colombia. Its drupe must be very large and conspicuous, but little has been recorded by collectors or authors concerning the color, size, configuration, and other features in the fresh state.

17. **Cordia sulcata** DC. Prodr. 9: 488 (1845). — Type from Guadeloupe, *Bertero*.

Ranging from the Barbados and St. Vincent north to Cuba.

SABA: *Boldingh 1477* and *1495* (NY). ST. KITTS: *Britton & Cowell 302* (NY). ANTIGUA: *Box 1491* (US). MONTSERRAT: *Shafer 475* (NY, US); *Ma'oney 420* (G). GUADELOUPE: *Bertero* (G, photo of TYPE); *Duss 3079* and *3773* (NY, US); *Stehlé 295* (US), *1078* (US), *1831* (US), *2220* (US), *2677* (G). DOMINICA: *Imray* (G); *Beard 661* (G); *Narodny 1* (G); *Eggers 829* (G); *Hodge 3154* and *3745* (G). MARTINIQUE: *Duss 1426* (NY, US), *4502* (NY), *4703* (G, NY, US); *Hahn 752* (NY); *Stehlé 4468* (US). ST. VINCENT: *Smith 771* (G, NY). BARBADOS: *Eggers 7294* (G, US).

This is a species endemic to the West Indies which is found in the Lesser Antilles and in all the Greater Antilles except Jamaica. Its closest relative is *C. macrophylla* L., an endemic of Jamaica, which differs only in having much larger, more elongate leaves, and a shaggy-velvety indument on twigs, petioles, and inflorescences. The only other close relative of *C. sulcata* is *C. panamensis* of Trinidad, Tobago, and Central America. This latter differs in its bristly twigs, very scabrous upper leaf-surface, and non-cordate leaf-bases. These three species, *C. sulcata, C. macrophylla,* and *C. panamensis,* are immediately related and are distinguishable by neither flowers nor fruit. They have, however, distinct geographic ranges and are separable by vegetative characters. Though not "strong" species, they are useful units worthy of continued recognition.

The type of *C. sulcata* DC. is an immature specimen with new, partially expanded foliage and flower-buds. It was collected on Guadeloupe by Bertero. In addition to the islands from which I have cited specimens, the species is reported from St. Eustatius and St. Lucia.

18. **Cordia panamensis** Riley, Kew Bull. 1927: 125 (1927); Johnston, Jour. Arnold Arb. 21: 347 (1940). — Type from Panama.

Known only from Central America, Trinidad and Tobago.

TRINIDAD: Southern Watershed Reserve, *Marshall, Herb. Trin. 12433* (T); Southern Watershed Reserve, main ridge, tree 25 ft. tall, *Marshall, Herb. Trin. 12410* (T); S. W. Reserve, *Russell, Herb. Trin. 12262* (T); Quinam Road, Southern Range, small tree, *Williams, Herb. Trin. 12186* (T); Maracas Bay, *Dannouse, Herb. Trin. 6749* (T); Maracas, *Herb. Trin. 1843* (T); Arima, *Dannouse, Herb. Trin. 8986* (T); St. Patrick, Dardaine, *Herb. Trin. 11588* (T); Monos, *Herb. Trin. 1845* (T); Botanic Garden near

Carpenter Shop, *Broadway, Herb. Trin. 3833* (T); Botanic Garden, *Herb. Trin. 1050* and *5942* (T). TOBAGO: tree 40 ft. in woods, 800 ft. alt., *Eggers 5590* (G).

In the past this tree of Trinidad and Tobago usually has been identified as "*Cordia sulcata*." I am unable to distinguish it from *C. panamensis*, a species previously recognized only in Central America. No species native to northern South America is readily confused with it. The relations of the plant are with *Cordia sulcata* DC., which ranges in the West Indies from Barbados to Cuba. Among its distinctive features are its bristly twigs and inflorescence and its harsh, very scabrous upper leaf-surfaces. Excellent field observations concerning the tree in Trinidad are given (sub *Cordia sulcata*) by R. C. Marshall, Silviculture of trees in Trinidad and Tobago, pp. 174–5 (1939). He reports the ripe fruit as a round, whitish, translucent drupe that is smooth, about 1 cm. in diameter, and very suggestive of a rather large English white currant. It contains a hard, woody, irregularly shaped stone, about 6 mm. in diameter, embedded in mucilaginous pulp.

19. **Cordia sericicalyx** A. DC. Prodr. 9: 485 (1845); Johnston, Jour. Arnold Arb. 16: 25 (1935). — Type from British Guiana.

Cordia ierensis Britton, Bull. Torr. Bot. Club **50:** 54 (1923). — Type from Morne Bleu, Trinidad, *Britton, Freeman & Bailey 2277*.

Ranging from Dutch Guiana to western Colombia and north into Trinidad.

TRINIDAD: Morne Bleu, tree 10 m. tall, *Britton, Freeman & Bailey 2277* (NY, TYPE; G, T); Mount Tocuche, tree 15 m., corolla white, *Britton, Hazen & Mendelson 1344* (G, NY); Blanchisseuse Road near 9-mile post, small tree, *Broadway 6000* (G); St. Anne, *Herb. Trin. 1848* (T); Maracas, *Herb. Trin. 588* (T); Maraval, *Herb. Trin. 4533* (T); Arima-Blanchisseuse road, 14th-15th mile, *Marshall, Herb. Trin. 12882* (T); Tucuche, *Britton & Freeman, Herb. Trin. 9094* (T); Tucuche, *Williams, Herb. Trin. 11016* (T).

This species commonly has relatively thin, rather smooth, parchment-like leaves that are usually markedly heteromorphic. The leaf-surfaces, twigs, and inflorescences are very finely and minutely short-strigose. The indument, though readily detected with a hand lens, is inconspicuous. At a casual glance the mature twigs and leaves might pass as glabrous. Some field observations concerning this species (sub *Cordia ierensis*) are given by R. C. Marshall, Silviculture of trees of Trinidad and Tobago, p. 175 (1939). Marshall states that the drupe is green, about 1 cm. long, and contains an irregular stone embedded in a mucilaginous pulp.

2. ROCHEFORTIA

KEY TO THE SPECIES

Twigs very thorny; flowers nearly sessile, borne one or two together directly on axillary short-shoots ..... 1. *R. acanthophora.*

Twigs with few or no thorns; flowers borne several to many in a distinctly pedunculate cyme ..... 2. *R. cuneata.*

1. **Rochefortia acanthophora** (DC.) Griseb. Fl. Br. W. I. 482 (1861).

Ehretia acanthophora DC. Prodr. **9**: 510 (1845). — Type from Santo Domingo.

ANTIGUA: *Box 858* (G).

The species is reported from St. Martin and St. Eustatius.

2. **Rochefortia cuneata** Sw. Prodr. 54 (1788) and Fl. Ind. Occ. **1**: 552 (1897). — Type from Jamaica.

GUADELOUPE: *Duss 2753* (G).

The species is also reported from Dominica and Martinique.

3. BOURRERIA

Bourreria succulenta Jacq. Enum. 14 (1760) and Sel. Stirp. 44 (1763). — Type from Curaçao.

Bourreria recurva Miers, Contr. **2**: 234 (1869). — Type from Dominica.

Ranging from Florida to Venezuela and Panama, generally distributed in the West Indies.

ANGUILLA: *Boldingh 3518* (NY). ST. MARTIN: *Boldingh 2805* (NY). ST. BARTHÉLEMY: *Forsström* (NY); *Questel 90* (NY). ST. KITTS: *Britton & Cowell 366* (NY). MONTSERRAT: *Shafer 310* and *497* (NY). GUADELOUPE: *Duss 2752* (G, NY). MARIE GALANTE: *Stehlé 2837* (G). DOMINICA: *Fishlock 53* (NY); *Lloyd 616, 661,* and *664* (NY). MARTINIQUE: *Stehlé 6051* (G); *Hahn 920* and *1095* (G); *Bailey 203* (G). ST. VINCENT: *Smith 551* (G, NY) and *569* (G). GRENADA: *Broadway* (G). TOBAGO: *Broadway 9166* (G); *Eggers 5517* (G); *Williams, Herb. Trin. 11444* (T). TRINIDAD: Maraval, *Baptiste, Herb. Trin. 5860* (T).

Schulz in his monograph of the genus, Urban Symb. Ant. 7: 58 (1911), reports collections from St. Eustatius, Antigua, St. Lucia, Bequia, and Mustique.

The name of the present genus has variant spellings in *"Bourreria,"* *"Beurreria,"* and *"Beureria."* The first, however, is correct. The name was proposed and first applied to our genus by Patrick Browne, Nat. Hist. Jamaica 168 (1756), who spelled it *"Bourreria."* This spelling was adopted by Jacquin, Enum. 2 and 14 (1760), who was the first author to use the concept and name in a publication employing binomial nomenclature. This act established the correct orthography. To be sure Jacquin, Sel. Stirp. 44 (1763), later adopted the spelling "Beurreria," and subsequent authors, notably O. E. Schulz, the spelling "Beureria," but these are not corrections of error but expressions of personal taste, and are not sanctioned by rules of nomenclature. Cf. Kew Bull. 1935: 385 (1935).

BOURRERIA CUMANENSIS (Loefl.) O. E. Schulz.

A form of this species was described as *Crematomia Guildingiana* Miers, Contr. **2**: 246, *t. 87* (1869), and given as having been collected on St. Vincent by Guilding. If the plant is not mislabeled it almost certainly represents, not a wild, but a cultivated plant, probably one from the botanic garden that flourished on St. Vincent early in the nineteenth century. The

species is known with certainty only from the dry north coast of Colombia and Venezuela, and though it might be expected on some of the small dry islands near Trinidad, it is certainly not to be expected on St. Vincent.

4. TOURNEFORTIA

Key to the Species

Leaves linear-spathulate, broadest below the apex and gradually contracted towards the attachment, 3–10 cm. long, silvery silky from an abundance of appressed hairs; fruit with a very thin flesh, having a basal central cavity, very tardily breaking up into a pair of two-seeded nutlets; strand plant.....1. *T. gnaphalodes.*

Leaves with a distinct blade and petiole; fruit with a very fleshy mesocarp, with a lobed or unlobed stone not hollow at the base.

Fruit with a conspicuously 2–4-lobed stone; embryo curved; corolla-lobes subulate or cuneate, greenish or yellowish; style elongate, falling with the corolla.

Corolla-tube 3–8 mm. long, with a moderately expanded throat, lobes not more than half the length of the tube, cuneate; ripe fruit orange or yellow; leaves nearly glabrous....2. *T. maculata.*

Corolla-tube 1.5–3 mm. long, constricted at summit, lobes subulate, nearly as long as tube; ripe fruit usually white.

Leaves 4–10 cm. broad, 8–18 cm. long, leathery; inflorescence narrow, stiff, the branches short, densely flowered and divaricate, borne on an elongate axis...3. *T. subsessilis.*

Leaves 0.5–4(–6) cm. broad, 3–10(–12) cm. long, firm but not leathery; inflorescence loosely branched..4. *T. volubilis.*

Fruit with ovoid stone, at most merely sulcate on the sides; embryo straight; corolla-lobes elliptic to triangular-ovate, white; ripe fruit white.

Style elongate, 1–3 mm. long, usually falling with corolla; leaves very large, usually 15–40 cm. long, and having 11–15 pairs of major veins; tree, up to 9 m. tall.....5. *T. filiflora.*

Style very short, sessile and persistent on the mature fruit; leaves 5–20 cm. long, with 4–9 pairs of veins; plant usually scandent or climbing.

Foliage and twigs glabrous or practically so; calyx-lobes 1–2 mm. long.....6. *T. bicolor.*

Foliage and twigs evidently hairy.

Calyx-lobes lanceolate, 2–4 mm. long; stems bearing short curved grayish hairs about 1 mm. long; corolla-tube 4–5 mm. long.....7. *T. hirsutissima.*

Calyx-lobes subulate, 5–9 mm. long, slender and long-attenuate; stems shaggy, bearing abundant slender brown hairs 2–4 mm. long; corolla-tube 5–8 mm. long.....8. *T. cuspidata.*

1. **Tournefortia gnaphalodes** (L.) R. Br. ex R. & S. Syst. 4: 538 (1819).

Heliotropium gnaphalodes L. Syst. ed. 10, 913 (1759); Amoen. Acad. **5:** 376 and 394 (1759). — Type West Indian.

Mallotonia gnaphalodes (L.) Britton, Ann. Missouri Bot. Gard. **2:** 47 (1915).

Messerschmidia gnaphalodes (L.) Johnston, Jour. Arnold Arb. **16:** 165 (1935).

A strand plant widely distributed in the West Indies.

GUADELOUPE: *Stehlé 2687* and *2842* (G). MARTINIQUE: *Duss 246* (G). MUSTIQUE: *Smith G26* (G).

In addition to the islands mentioned above it has been reported in the Lesser Antilles from Anguilla, St. Martin, St. Barthélemy, Saba, St. Eustatius, Antigua, St. Vincent, Bequia, Carriacou, and Barbados. It is not reported from Trinidad nor Tobago, but is well known to the westward on the islands off the Venezuela coast. Guppy, Plants, Seeds and Currents, p. 247 (1917), has given observations regarding the behavior of the fruits of *T. gnaphalodes* and its modes of distribution in the West Indian drift.

Considering the present status of classification in the subfamily *Heliotropioideae* it has seemed best to assign this species to *Tournefortia*. Traditionally in this subfamily those species with dry fruits have been placed in *Heliotropium* and those with a fleshy mesocarp in *Tournefortia*. There are reasons for believing that this may not be a natural division. However, until the subfamily is thoroughly studied and a convincingly natural new classification has been worked out, it seems best to continue the separation of *Tournefortia* and *Heliotropium* in the traditional manner. To assign the present species to the monotypic *Mallotonia* or to group it with two Old World species in *Messerschmidia* is inconsistent when other equally distinct groups of species are still submerged in the older traditional genus.

This West Indian species has a fleshy mesocarp, although a very scanty one that soon dries. Otherwise the fruit is very similar to that found in certain groups of *Heliotropium*. Its only distinctive feature is the presence of corky tissue, a feature which I emphasized in assigning the plant to *Messerschmidia*. This, incidentally, has its weakest development in our West Indian plant.

2. **Tournefortia maculata** Jacq. Enum. 14 (1760) and Sel. Stirp. 47 (1763). — Type from Cartagena, Colombia.

Tournefortia syringaefolia Vahl, Symb. **3:** 23 (1794); Johnston, Jour. Arnold Arb. **16:** 48 (1935). — Type from French Guiana.

Tournefortia peruviana Poir. Encyc. Suppl. **4:** 425 (1816); Urban, Symb. Ant. **8:** 586 (1921). — Type from Peru.

Tournefortia Sagraeana DC. Prodr. **9:** 522 (1845). — Type from Cuba.

Tournefortia guadelupensis Urban, in Fedde Repert. **17:** 169 (1921). — Type from Guadeloupe, *Duss 3992*.

Ranging from Cuba and southern Mexico south through the West Indies and Central America into northern and western South America.

GUADELOUPE: *Duss 3992* (G). DOMINICA: *Hodge 2385* (G). TOBAGO: *Broadway 4606* (G). TRINIDAD: *Broadway 6389* (G).

The long-neglected name *T. maculata* Jacq. is evidently the oldest and proper name for this widely distributed plant. Jacquin (1763) described

fruiting specimens from Cartagena, Colombia, as follows: "TOURNEFORTIA (*maculata*) *foliis* ovatis, utrinque glabris; spicis ramosissimis, pendulis. Frutex *ramis* debilibus; *foliis* integerrimis, acuminatis, petiolatis, inodoris; *fructibus* luteis basi quatuor maculis subrotundis atrisque notatis. Habitat Carthagenae in arbustis & sepibus." The glabrous leaves and the yellow drupes splotched with black are distinctive features of the present plant.

In the West Indies and Central America *T. maculata* presents problems in delimitation only in Jamaica, Haiti, and Porto Rico. Plants from these islands, described as *T. laurifolia* Vent. and *T. jamaicensis* Urban, differ from ordinary *T. maculata* in their larger, long-attenuate calyx- and corolla-lobes. In Jamaica and Haiti plants with short or elongate lobes both occur, but in Porto Rico only the latter. The plants with elongate attenuate lobes seem to deserve some nomenclatural recognition, but only field work will determine whether this should be as species, variety, or form.

3. **Tournefortia subsessilis** Cham. Linnaea 8: 119 (1833); Johnston, Contr. Gray Herb. 92: 85 (1920). — Type from Brazil.

Known only from eastern Brazil and Trinidad.

TRINIDAD: Balandra Bay, June 21, 1921, *Freeman, Herb. Trin. 10431* (T); Balandra Bay, Dec. 8, 1933, shrub near sea, corolla reddish, *Broadway 9331* (G); road near sea between Balandra and Toco, fl. yellow, fruit drupaceous, lobed, apparently ripening white, Aug. 20, 1940, *Cheesman & Baker 370, Herb. Trin. 13735* (T).

I am unable to distinguish the above cited collections from the plant of eastern Brazil (Bahia) known as *T. subsessilis*. The plant, though related to *T. volubilis*, has a more compact, more elongate, and less branched inflorescence that is made up of short, much more densely flowered scorpioid cymes. Furthermore, its leaves are also very much larger. Indeed, in general appearance the leaves are most suggestive of those of *T. bicolor*. The blade is ovate to elliptic, 4–10 cm. broad, 8–18 cm. long, somewhat leathery in texture, lustrous and practically glabrous above, and dull and glabrescent beneath. Balandra Bay is on the Atlantic coast of Trinidad about 10 miles from the northeast corner of the island. It lies about 2000 miles from the Brazilian localities at which the species has been previously known. No plant readily confused with it is known north of the Amazon.

4. **Tournefortia volubilis** L. Sp. Pl. 140 (1753). — Type West Indian.

Tournefortia sericea Vahl, Ecol. 1: 17 (1796). — Type from Montserrat, *Ryan*.

Messerschmidia punctata Spreng. Neue Entdeck. 3: 28 (1822). — Type from Martinique, *Sieber*.

Tournefortia punctata Spreng. Syst. 1: 643 (1825).

Tournefortia psilostachya, var. *caribaea* DC. Prodr. 9: 525 (1845). — Based on material from Guadeloupe, Martinique, and Trinidad.

Tournefortia caribaea (DC.) Griseb. Fl. Brit. W. I. 484 (1861).

Tournefortia barbadensis N. E. Brown ex Britton, Bull. Torr. Bot. Club 48: 343 (1922). — Type from Barbados, *Bovell & Freeman 404*.
Tournefortia trinitatis Riley, Kew Bull. **1925:** 139 (1925). — Type from Trinidad, *Riley 210*.

An extremely variable species ranging from Florida and Mexico south through the West Indies and Central America into South America.

MONTSERRAT: *Ryan* (G, photo of TYPE). GUADELOUPE: *Stehlé 2685, 2686, 2832,* and *2841* (G). MARIE GALANTE: *Stehlé 2836* (G). DOMINICA: *Hodge 2533, 2542, 3083, 3084,* and *3152* (G); *Eggers 689* (G); *Imray* (G). MARTINIQUE: *Duss 4504* (G); *Hahn 415* (G); *Sieber 63* (G). GRENADA: *Broadway* (G). ST. VINCENT: *Eggers 6600* (G); *Smith 127, 1277,* and *1540* (G). BARBADOS: *Eggers 7097* (G). TOBAGO: *Broadway 3665* (G); *Eggers 5914* (G). TRINIDAD: Chacachacare, *Herb. Trin. 1858* (T); Patos Island, *Broadway 8908* (G); Gasparee Island, *Britton 451* and *2781* (G); St. Anne, *Broadway, Herb. Trin. 9203* (T).

In one form or another this extremely variable species is to be expected on all the islands in our area. In addition to islands from which specimens are cited above, it has been reported from St. Martin, St. Barthélemy, Saba, St. Eustatius, Desirade, St. Lucia, Bequia, and Mustique. The species is the most variable member of its genus. Its leaves vary greatly in size and shape as well as in quality, quantity, distribution and color of pubescence. Forms of the plant may differ conspicuously in gross appearance. With so many diverse phases it is not surprising that the species has accumulated the most extensive synonymy in the genus. Above I have given only those names that are based on plants originating in our area. These apply to phases of the plant that are neither unusual in appearance nor endemic to our region. As with most of the phases named in other regions, the named ones from the West Indies can be expected to appear here and there erratically at widely separated places within the total geographical range of the species.

5. **Tournefortia filiflora** Griseb. Fl. Brit. W. I. 483 (1861); Urban, Symb. Ant. 4: 522 (1910). — Type from Dominica, *Imray*.

Ranging from Porto Rico south to St. Vincent.

GUADELOUPE: *Stehlé 2697* and *2839* (G). MARIE GALANTE: *Stehlé 2838* (G). DOMINICA: *Hodge 1592* (G); *Imray 322* (G). ST. VINCENT: *Smith 1542* (G).

As originally published *T. filiflora* included not only our present plant but also material of another species from Jamaica. I am following Urban, l. c., who limited the species to the plant distributed from Porto Rico to St. Vincent. With the type to be selected from among the non-Jamaican specimens cited by Grisebach, the best choice is Imray's collection from Dominica. The plant grows in Porto Rico and the Virgins and is reported from St. Martin, Saba, St. Eustatius, St. Kitts, and St. Lucia. It replaces *T. foetidissima* L. in the West Indies south of Hispaniola. The various reports of the latter species in the Lesser Antilles probably all apply to *T. filiflora*.

6. **Tournefortia bicolor** Sw. Prodr. 40 (1788) and Fl. Ind. Occ. **1**: 344 (1797). — Type from Jamaica.

Tournefortia laevigata Lam. Tab. Encyc. **1**: 416 (1791); Poir Encyc. **5**: 356 (1804). — Type from Guadeloupe, *Badier*.

Widely distributed in the American tropics.

GUADELOUPE: *Stehlé 710, 2831,* and *2835* (G), *Duss 2579* (G). MARIE GALANTE: *Stehlé 2694* and *2834* (G). DOMINICA: *Cooper 195* (G); *Eggers 688* (G); *Hodge 132, 2126, 2347, 3165, 3176, 3262, 3721,* and *3756* (G). MARTINIQUE: *Hahn 719* (G); *Duss 4503* (G). ST. VINCENT: *Smith 434* (G). GRENADA: *Alexander, Herb. Trin. 434* (T). TRINIDAD: *Broadway 9104* and *9844* (G); *Britton 2206* (G); *Britton & Hazen 409* (G).

The plant occurs on most of the islands in our area. Besides those from which specimens are cited, it has been reported from Saba, St. Kitts, Antigua, Montserrat, Barbados, and Tobago.

7. **Tournefortia hirsutissima** L. Sp. Pl. 140 (1753). — Type from Haiti.

Widely distributed in tropical America.

GUADELOUPE: *Stehlé 2840* (G). MARTINIQUE: *Duss 1207* (G). TOBAGO: *Eggers 5609* (G); *Williams 11113* (G). TRINIDAD: *Broadway* (G); *Johnston 79* (G).

This species appears to have a limited distribution in our area. I have seen specimens from only a very few islands and have found reports from only two additional ones, St. Martin and St. Vincent.

The original description of *T. hirsutissima* L. was based upon a drawing made by Plumier, which Linnaeus studied in Holland previous to the publication of the Species Plantarum. The drawing was no doubt that subsequently published by Burman, Pl. Am. Plumier *226, t. 229* (1760). Notes associated with Plumier's original drawings at Paris indicate that the plant concerned was collected near Léogane, Haiti.

8. **Tournefortia cuspidata** HBK. Nov. Gen. et Sp. 3: 83 (1818); Johnston, Jour. Arnold Arb. 16: 54 (1936). — Type from Ecuador?

Tournefortia obscura DC. Prodr. **9**: 517 (1845). — Type from British Guiana.

Tournefortia setifera Urban & Ekman, Arkiv Bot. **22**A: no. 17: 94 (1930). — Type from Haiti, *Ekman H10204*.

Tropical South America, southern Central America, Trinidad, and Haiti.

TRINIDAD: Cedros at St. Anna, low cliff, seashore, *Broadway, Herb. Trin. 9407* (T); Irois forest, *Williams, Herb. Trin. 12046* (T); Cap de Cille, shrub in roadside bush, *Baker, Herb. Trin. 14205* (T).

5. HELIOTROPIUM

KEY TO THE SPECIES

Flowers scattered along the elongate leafy stems; fruiting pedicels elongate, 2–10 mm. long; fruit conic above the middle.....1. *H. lagoense*.

Flowers aggregated into crowded unilateral spikes; fruiting pedicels stout, 0–1 mm. long; fruit rounded or depressed at summit.

Plant completely glabrous, very succulent, usually somewhat glaucous. . . . . 2. *H. curassavicum.*
Plant hairy; herbage not decidedly succulent, never with a pallid waxy bloom.
Petiole short, 1–4 mm. long; spike bearing scattered small bracts; fruit dividing into 4 similar single-seeded nutlets, strigose.
Leaf-blade 2–5 mm. long; plant a low much-branched perennial, usually densely strigose and silvery-silky; style very short and obscure. . . . . 3. *H. microphyllum.*
Leaf-blade 10–30 mm. long; plant laxly branched, erect.
Plant perennial, shrubby, 3–15 dm. tall; leaf-blade abruptly contracted into a petiole 1–2 mm. long, style elongate, evident. . . . . 4. *H. ternatum.*
Plant annual, 1–3 dm. tall; leaf-blade very gradually contracted into a petiole 2–4 mm. long; style very short and obscure. . . . . 5. *H. filiforme.*
Petiole well developed, evident, 5 mm. long or longer; spikes without bracts among the flowers; plants usually annual.
Corolla usually blue or violet, the tube 2–4.5 mm. long and much exserted from the calyx; fruit glabrous, ribbed, angulate, cleft vertically, the two lobes divergent and each breaking up into a pair of single-seeded nutlets. . . . . 6. *H. indicum.*
Corolla white, tube short, scarcely if at all surpassing the small calyx; fruit not cleft.
Fruit breaking up into 4 single-seeded nutlets, strigose; spikes commonly paired and usually 2–5 cm. long; plant usually densely strigose and cinereous. . . . . 7. *H. procumbens.*
Fruit breaking in half, the halves each 2-seeded, epidermis roughened by minute bladder-like swellings that collapse and appear scale-like in age; spikes commonly single and usually becoming 10 cm. long; plant sparingly appressed hairy, green. . 8. *H. angiospermum.*

1. Heliotropium lagoense (Warm.) Gürke in Engler & Prantl, Nat. Pflanzenf. iv. Abt. 3a: 97 (1893).

Schleidenia lagoensis Warming, Kjoeb. Vidensk. Meddel, **1867**: 15 (1868). — Type from Brazil.

Heliotropium trinitense Urban, Symb. Ant. **7**: 350 (1912). — Type from Piarco Savanna, Trinidad, *Lunt 6030.*

Known from Brazil, eastern Bolivia, Surinam, Venezuela, Panama, Costa Rica, Guatemala, and Trinidad.

TRINIDAD: Piarco Savanna, *Lunt 6030* (Berlin, TYPE; fragment, G); Piarco Savanna, 1895, *Lunt, Herb. Trin. 6030* (T); Piarco, airfield, plant decumbent, fl. white with yellow tube and eye, March 1939, *Cheesman, Herb. Trin. 13375* (T).

A broadly distributed species known only from a relatively few widely scattered localities. Its wiry, slender, ascendingly branched stems are laxly decumbent or prostrate, usually spring from a clearly annual root,

and usually become 1–2 dm. long. It is a plant of damp soil and has been collected most frequently where savanna conditions prevail.

2. **Heliotropium curassavicum** L. Sp. Pl. 130 (1753). — Type from Curaçao.

Widely distributed in the warmer parts of America, growing along coasts and in saline soils inland.

St. Martin: *Walsh* (NY). St. Barthélemy: *Forsström* (NY). Guadeloupe: *Duchassaing* (G); *Stehlé 707* and *2833* (G); *Duss 2755* (G, NY). Martinique: *Duss 1416* (NY); *Egler 394* (NY). St. Vincent: *Smith 1213* (G). Union: *Smith D34* (NY). Grenada: *Broadway* (NY). Barbados: *Dash 353* (NY).

This halophyte is to be expected on all the Lesser Antilles. In addition to the stations given above, the plant is reported from St. Eustatius, Antigua, Marie Galante, Bequia, and Mustique. Surprisingly, there are no reports of its occurrence on either Trinidad or Tobago.

3. **Heliotropium microphyllum** Sw. ex Wikström [Ofv. Guadeloupe. Fl.] K. Vet. Akad. Handl. 1827[1]: 58 (1828). — Type from Guadeloupe, *Forsström*.

A variable species ranging north through the Virgins, Porto Rico, Hispaniola, and Cuba into the Bahamas.

Anguilla: *Boldingh 3517* (NY). St. Martin: *Boldingh 3034* (NY). Guadeloupe: coralline rocks along coast, alt. 30 m., Point des Château, *Stehlé 2696* (G).

The species is here interpreted in the broadest sense and includes the habitally similar plants found in the Greater Antilles and the Bahamas. The plants are moderately variable but hardly to the degree that would justify the many segregate species that have been proposed. From Haiti the plant has been described as *H. plumerii* Urban, *H. elegans* Urban, and *H. glomerifolium* Urban, and from Porto Rico as *H. crispiflorum* Urban. Even more names have been applied to plants of Cuba and the Bahamas.

4. **Heliotropium ternatum** Vahl, Symb. Bot. 3: 21 (1794). — Type from the West Indies.

Pioctonon ternatum (Vahl) Raf. Sylva Tellur. 88 (1838).

Tournefortia humilis L. Sp. Pl. 141 (1753); Syst. ed. 10, 917 (1759); Sp. Pl. ed. 2, 202 (1762). — Based on a plant of Martinique illustrated by Plumier.

Heliotropium humile (L.) R. Br. ex R. & S. Syst. **4**: 37 (1819), not Lam. (1791).

Heliotropium hirtum Lehm. Neue Schr. Naturf. Ges. Halle 3[2]: 10 (1817), Nov. Acta Acad. Caes. Leop. Nat. Cur. **9**: 135 (1818), and Asperif. **1**: 62 (1818); R. & S. Syst. **4**: 38 (1819). — Type from Venezuela.

Heliotropium hispidum HBK. Nov. Gen. et Sp. **3**: 87 (1817) and 451 (1820). — Type from Venezuela.

Heliotropium fruticosum, var. *hispidum* (HBK.) DC. Prodr. **9**: 543 (1845).

Schleidenia hispida (HBK.) Fresen. in Mart. Fl. Bras. 8[1]: 37 (1857).

Heliotropium demissum R. & S. Syst. **4:** 37 and 733 (1819), in pt. — Type West Indian; a mixture of *H. ternatum* and *H. fruticosum.*

Pioctonon antillanum Raf. Sylva Tellur. 88 (1838), in pt. — Type West Indian; a mixture of *H. ternatum* and *H. fruticosum.*

Heliotropium fruticosum, var. *confertum* DC. Prodr. **9:** 542 (1845). — Type from Guadeloupe, *Bertero.*

Heliotropium fruticosum, var. *angustilobum* DC. Prodr. **9:** 543 (1845). — Type from Cuba.

Native to the West Indies, Yucatan, and northern Venezuela and Colombia.

ANTIGUA: *Box 1291* (G); *Rose, Fitch & Russell 3360* (NY). MONTSERRAT: *Shafer 412* (NY). DESIRADE: *Stehlé 288* (NY), *2829* (G); *Duss 2756* (NY). DOMINICA: *Imray* (G); *Bailey 750* (NY); *Lloyd 827* (NY); *Hodge 3790* (G). MARTINIQUE: *Sieber, Fl. Mixta 430* (G, NY); *Duss 1417* (G, NY), *Egler 39–6* and *39–53* (NY); *Hahn 416* (G); *Stehlé 2215* (NY), *3469* (G), *6168* (G). ST. VINCENT: *Smith 977* (G, NY).

A loosely branched shrubby plant frequently forming a bush 3–20 dm. tall. I have seen one collection from Cuba (*Wright 3135*) and numerous collections from the Bahamas, Jamaica, Porto Rico, and the Virgins. The species has been reported from Haiti, Guadeloupe, St. Lucia, and Bequia. It is apparently absent from Trinidad and Tobago, but is common along northern Venezuela and on the adjacent Margaritas and Dutch islands.

Distinctive of the species is its bushy growth and strong root and its development of opposite or ternate leaves at one or more nodes on vigorous shoots. It varies considerably in size and shape of leaves, in pubescence, and in quantity of opposite or ternate leaves developed. In the West Indies it has been confused with the very different *H. fruticosum* L., cf. Johnston, Contr. Gray Herb. 81: 66 (1928). That species occurs in Porto Rico, Haiti, and Jamaica, and on the continent, and is readily distinguished from our plant by having a lower habit, annual root, and well-developed leaf-like bracts in the inflorescence. In an earlier paper I failed to distinguish *H. ternatum* from the related South American *H. Ottoni* Lehm. That latter species has synonyms in *H. strictum* HBK., *Tournefortia monostachya* Willd., *H. Ottonianum* R. & S., *H. Ottonis* DC., *H. strictissima* Moric., and *Schleidenia subracemosa* Warm. It differs from our species in its short-lived chiefly annual root, few usually sparingly branched and frequently strict stems, uniformly alternate leaves, and more southerly range. The plant has been found from northern Venezuela to eastern Brazil. Though formerly confused with *H. salicoides* Cham., both *H. Ottoni* and *H. ternatum* are readily distinguished by their white rather than decidedly yellow corollas, cf. Johnston, Jour. Arnold Arb. **16:** 62 (1935). In Central America *H. ternatum* is confined to the Yucatan peninsula, being replaced in Mexico and other parts of northern Central America by the closely related but lower-growing and less strongly perennial *H. oaxacana* DC. and *H. mexicanum* Greenm. These two latter species have only alternate leaves. The more northerly ranging *H. mexicana* occurs from Oaxaca to Sonora and Nuevo Leon and has retrorse

hairs on its leafy twigs, as well as leaves that are usually broadest at or above the middle.

For the present species Urban, Symb. Ant. 8: 590 (1921), has used the name "*H. humile* (L.) R. Br. Prodr. I (1810) p. 497 (non Lam.)." The name is based upon *Tournefortia humilis* L., which has its ultimate basis in a plant illustrated by Plumier. It is known that Linnaeus, while in Holland, studied copies of Plumier's plates during the preparation of the Species Plantarum. Among these was the representation of the present species later published by Burnam, Pl. Amer. Plumier. *224, t. 227, f. 2* (1760). Notes accompanying the original drawing at Paris state that the plant concerned was collected on Martinique (south end) in the area known as "La pointe des Salines au Cul de Sac Marin." It is a very coarse atypical form of *H. ternatum*. Urban indicates that Robert Brown made the combination "H. humile." This is incorrect. The actual transfer was first published by Roemer & Schultes, Syst. 4: 37 (1819), and even then only as a synonym. This binomial, in any case, is not a valid name for our plant, since it is a late homonym of *H. humile* Lam. Tab. Encyc. 1: 393 (1791). The application of Lamarck's binomial has been uncertain. I have referred it to the synonymy of *H. angiospermum* Murr.

5. **Heliotropium filiforme** Lehm. Götting. Gel. Anzeigen 1817: 1515 (1817), and Asperif. 1: 37 (1818); Johnston, Contr. Gray Herb. 81: 61 (1928) and Jour. Arnold Arb. 16: 62 (1935). — Type from Venezuela.

Paraguay and eastern Bolivia northward through Brazil to the Guianas and Venezuela; northern Central America and adjacent Mexico; Trinidad.

TRINIDAD: Icacos, *Broadway 7401* (T).

This is a plant of wet ground. It has been collected most commonly near streams.

6. **Heliotropium indicum** L. Sp. Pl. 130 (1753).

A weedy plant widely distributed in the warmer parts of the world.

ANTIGUA: *Box 929* (G). MONTSERRAT: *Shafer 366* (NY). DOMINICA: *Lloyd 247* (NY); *Hodge 3872* (G). MARTINIQUE: *Duss 1419* (G, NY). ST. LUCIA: *Walsh* (NY). ST. VINCENT: *Smith 1213* (G). BEQUIA: *Joseph 231* (NY). GRENADA: *Broadway* (G, NY). BARBADOS: *Freeman 12H* (NY). TRINIDAD: *Herb. Trin.*

Reported from most of the islands in our area and very probably present on all of them.

7. **Heliotropium procumbens** Miller, Dict. ed. 8, no. 10 (1768); Johnston, Contr. Gray Herb. 81: 52 (1928). — Type from Cartagena, Colombia.

Heliotropium inundatum Sw. Prodr. 40 (1788) and Fl. Ind. Occ. 1: 343 (1797). — Type from Jamaica.

A species widely distributed in the warmer parts of America but of restricted occurrence in the West Indies.

ANTIGUA: *Box 852* and *1357* (G). TRINIDAD: *Broadway* (G, NY); *Britton 2506* (G, NY), *Britton & Hazen 720* (NY).

The plant has been found in Jamaica, Cuba, Hispaniola, and Porto Rico, but is very rare or absent in the Lesser Antilles. It has been reported from Guadeloupe, but recent collectors have not found it there, and Duss, Fl. 452–3 (1897), does not list it for the French islands. The plant is usually annual and usually favors places subject to periodic inundations of fresh water.

8. **Heliotropium angiospermum** Murray, Prodr. Stirp. Göttingen 217 (1770); Johnston, Contr. Gray Herb. 81: 10 (1928). — Type from a European botanic garden.

Schobera angiospermum Murray ex Scopoli, Intr. 158 (1777); Britton & Wils., Bot. Porto Rico **6:** 134 (1925).

Heliotropium parviflorum L. Mant. **2:** 210 (1771).

Heliotropium humile Lam. Tab. Encyc. **1:** 393 (1791); Johnston, Jour. Arnold Arb. **16:** 186 (1935).

Widely distributed in the warmer parts of America.

ST. MARTIN: *Boldingh 2344* (NY). ST. BARTHÉLEMY: *Forsström* (NY). ST. EUSTATIUS: *Walsh* (NY). ST. KITTS: *Kidder* (G); *Britton & Cowell 279* (NY). ANTIGUA: *Duss 41* (NY); *Box 1050* (G). GUADELOUPE: *Stehlé 762* (NY), *2688* (G), *2830* (G); *Duchassaing* (G, NY). MARTINIQUE: *Stehlé 3641* (G); *Duss 1418* (G, NY); *Hahn* (G); *Egler 39–45* (NY). ST. VINCENT: *Smith 1582* (NY). GRENADA: *Broadway* (NY). TOBAGO: *Williams* (T). TRINIDAD: *Broadway 2717* and *5140* (G).

A plant of sunny open places with well-drained soil. Frequently a weed in waste ground. The species has been reported from Anguilla, Saba, Dominica, and Barbados.

The name *H. humile* Lam. has long been of uncertain application and a source of confusion, cf. R. & S. Syst. 4: 38, 733 and 734 (1819) and Johnston, Contr. Gray Herb. 81: 67 (1928). It has been applied to such diverse species as *H. ternatum* Vahl, *H. fruticosum* L. and *H. angiospermum*. After a study of specimens available to Lamarck at Paris I am now of the opinion that *H. humile* Lam. belongs in the synonymy of *H. angiospermum*.

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